

CLAIMS

1. In combination with a powered opto-electronics unit within which optical signals are generated for determination of smoke density at a test location spaced therefrom a smoke detector system comprising; a passive sensor and a fiber cable connecting the sensor to the opto-electronics unit which comprises: a housing enclosing an air gap exposed through openings at said test location to smoke; collimating lens means mounted within the housing at one axial end thereof and connected to the fiber cable for transmission of said generated optical signals into the housing confined to the air gap; and focusing mirror means mounted within the housing at an opposite axial end of the housing for reflection of the optical signals through the air gap and the lens means into the fiber cable to be returned to the opto-electronics unit.
2. The combination as defined in claim 1, wherein the opto-electronics unit further includes: light emitting diode means for generation of the optical signals within a predetermined optical spectrum; receiver means for detecting varying effects of the smoke on the optical signals returned through the fiber cable; and optical coupler means connected to the receiver means, the fiber cable and the light emitting diode means for transmission of the optical signals therebetween.
3. The combination as defined in claim 2, wherein the receiver means includes: signal divider means connected to optical coupler means for splitting transmission of the light signals received therefrom along two signal paths; filter means within one of said signal paths for passage of only the optical signals with an upper half of the optical spectrum; detector means for respectively detecting the optical signals transmitted from the filter means and along the other of

said signal paths; and signal processing means connected to said detector means for converting the optical signals received therefrom into an output signal reflecting obscuration of the air gap by the smoke received therein.

4. A smoke detector system comprising: a powered opto-electronic unit within which optical signals are generated for determination of smoke density at a test location spaced therefrom; and passive sensor means connected by a fiber cable to the opto-electronics unit for sensing smoke received therein at said test location; said opto-electronic unit including: light emitting diode means for generation of the optical signals within a predetermined optical spectrum; receiver means for detecting varying effects of the smoke on the optical signals returned through the fiber cable; and optical coupler means connected to the receiver means, the fiber cable and the light emitting diode means for transmission of the optical signals therebetween.

5. The smoke detector as defined in claim 4, wherein the receiver means includes: signal divider means connected to optical coupler means for splitting transmission of the light signals received therefrom along two signal paths; filter means within one of said signal paths for passage of only the optical signals with an upper half of the optical spectrum; detector means for respectively detecting the optical signals transmitted from the filter means and along the other of said signal paths; and signal processing means connected to said detector means for converting the optical signals received therefrom into an output signal reflecting obscuration of an air gap in the sensor by the smoke received therein.